What is claimed is:

1. A microelectromechanical system comprising:

a substrate;

a platform attached to said substrate in a manner permitting said platform to be elevated in its entirety from said substrate; and

a lever arm attached to said substrate and pivotable in at least a first direction with respect to said substrate;

said platform being and attached to and said lever arm in a manner providing for inclination of said platform in at least the first direction in response to pivoting of said lever arm in the first direction.

2. The system of Claim 1 wherein said lever arm comprises an A-frame structure.

3. The system of Claim 2 further comprising:

at least one flexible member attaching a base of said A-frame structure to said substrate, said at least one flexible member being configured to permit pivoting of said A-frame structure in at least the first direction with respect to said substrate.

4. The system of Claim 1 further comprising:

a first compliant member attaching said platform to said substrate, said first compliant member being configured to permit elevation of said platform from said substrate to a desired height; and

a second compliant member attaching said lever arm to said platform, said second compliant member being configured to transmit force from said lever arm to said platform while permitting a point on said lever wherein said second compliant member is connected to swing through a first arc having a different radius than a second arc through which a point on said platform wherein said second compliant member is connected swings.

5. The system of Claim 4 wherein the second arc has a smaller radius than the first arc.

6. The system of Claim 4 wherein said first and second compliant members comprise springs.

7. The system of Claim 1 wherein said platform is attached to said substrate and said lever arm in a manner providing for a change in an angle of inclination of said platform in the first direction with respect to said substrate exceeding a change in an angle of pivot of said lever arm in the first direction with respect to said substrate upon pivoting of said lever arm in the first direction with respect to said substrate.

8. The system of Claim 7 wherein said platform is attached to said substrate at a first location, said lever arm is attached to said platform at a second location, and said lever arm is attached to said substrate at a third location, said first location being between said second and third locations.

9. The system of Claim 1 further comprising:

an actuator microstructure formed on said substrate, said actuator microstructure being coupled to said lever arm such that said actuator microstructure is operable to effect pivoting of said lever arm in at least the first direction with respect to said substrate.

10. The system of Claim 9 wherein said actuator microstructure is operable without external feedback control to effect pivoting of said lever arm in at least the first direction with respect to said substrate such that said platform is inclinable in at least the first direction at any desired angle with respect to said substrate within a specified range of angles.

11. The system of Claim 10 wherein the specified range of angles is between zero and ninety degrees.

12. The system of Claim 10 wherein said actuator microstructure comprises an electrostatic actuator operable in response to a control voltage applied across terminals thereof.

13. The system of Claim 9 further comprising:

a tether coupling a laterally moveable output of said actuator microstructure to said lever arm.

14. The system of Claim 13 further comprising:

a displacement multiplier coupling said tether to said laterally moveable output of said actuator microstructure, said displacement multiplier being configured for amplifying lateral movement of said moveable output of said actuator microstructure into larger lateral movement of said tether.

15. The system of Claim 13 wherein said actuator microstructure comprises a plurality of separate actuators having separate laterally moveable outputs, and said system further comprises:

a yoke coupling said laterally moveable outputs of said plurality of separate actuators together.

16. The system of Claim 1 further comprising:

at least one fuse securing said platform to said substrate, said at least one fuse being configured for releasing said platform from said substrate upon at least one of application of at least a predetermined voltage across said fuse and application of a pulse of electromagnetic energy to said fuse.

17. The system of Claim 1 further comprising:

at least one pre-stressed elevator attached to said substrate, said pre-stressed elevator being configured for elevating said platform to a predetermined height from said substrate upon release of said platform.

18. The system of Claim 1 wherein said platform is inclinable in at least the first direction at an angle with respect to said substrate exceeding forty-five degrees.

19. The system of Claim 1 wherein said platform includes at least one of an optically reflective surface, a diffraction grating, a lens, and an optical polarizer.

20. A microelectromechanical system comprising:

a substrate;

a platform including first, second and third attachment points, said platform being pivotably attached to said substrate at the first attachment point;

a first lever arm attached to said platform at the second attachment point of said platform and pivotably attached to said substrate at a first anchor point on said substrate; and

a second lever arm attached to said platform at the third attachment point of said platform and pivotably attached to said substrate at a second anchor point on said substrate;

said first attachment point being located on the same side of a line intersecting said second and third attachment points as a side of said line on which said first and second anchor points are located when said platform is in a non-tilted orientation with respect to said substrate;

said first and second lever arms being separately pivotable about said first and second anchor points, respectively, by unequal angular amounts to tilt said platform with respect to said substrate with at least two degrees of freedom.

21. The system of Claim 20 further comprising:

a first actuator microstructure formed on said substrate, said first actuator microstructure being coupled to said first lever arm and operable to effect pivoting of said first lever arm with respect to said substrate; and

a second actuator microstructure formed on said substrate, said second actuator microstructure being coupled to said second lever arm and operable to effect pivoting of said second lever arm with respect to said substrate.

22. The system of Claim 21 wherein said first and second actuator microstructures are separately operable without external feedback control to effect pivoting of said first and second lever arms, respectively, with respect to said substrate such that said platform is inclinable in a first direction with respect to said substrate at

any angle within a first specified range of angles and inclinable in a second direction with respect to said substrate at any angle within a second specified range of angles.

23. The system of Claim 22 wherein the first specified range of angles is between 0 and 60 degrees and said second range of angles is between -45 and +45 degrees.

24. The system of Claim 22 wherein said first and second actuator microstructures comprise electrostatic actuators operable in response to control voltages applied across terminals thereof.

25. The system of Claim 23 wherein said platform is tiltable with respect to said substrate with one degree of freedom by applying the same level control voltage across terminals of said first and second actuator microstructures.

26. The system of Claim 21 further comprising:

a first tether coupling a laterally moveable output of said first actuator microstructure to said first lever arm; and

a second tether coupling a laterally moveable output of said second actuator microstructure to said second lever arm.

27. The system of Claim 24 wherein said first and second actuator microstructures are respectively comprised of first and second groups of separate actuators having separate laterally moveable outputs, and said system further comprises:

a first yoke joining said laterally moveable outputs of said first group of actuators together for connection with said first tether; and

a second yoke joining said laterally moveable outputs of said second group of actuators together for connection with said second tether.

28. The system of Claim 27 further comprising:

a first displacement multiplier coupling said first tether to said first yoke; and

a second displacement multiplier coupling said second tether to said second yoke.

29. The system of Claim 20 wherein said substrate comprises silicon.

30. The system of Claim 20 wherein said platform comprises one of monocrystalline and polycrystalline silicon.

31. The system of Claim 20 wherein said platform includes at least one of an optically reflective surface, a diffraction grating, a lens, and an optical polarizer.

32. The system of Claim 20 further comprising:

a first compliant member attaching said platform to said substrate at the first attachment point;

a second compliant member attaching said first lever arm to said platform at the second attachment point; and

a third compliant member attaching said second lever arm to said platform at the third attachment point.

33. The system of Claim 32 wherein said first, second and third compliant members comprise springs.

34. The system of Claim 20 wherein said first and second lever arms have different lengths measured between where each said lever arm is attached to said substrate and to said platform.

35. A microelectromechanical system comprising:

a substrate;

a platform;

at least one tether laterally moveable with respect to said substrate in a direction parallel with a lengthwise axis of said tether and coupled at one end thereof to said platform; and

at least one compliant member pivotably attaching said platform to said substrate such that in response to lateral movement of said tether away from said platform said platform swings upwardly and away from said substrate, said at least one compliant member being configured to permit said platform to be elevated in its entirety from said substrate.

36. The system of Claim 35 wherein said platform includes a frame portion extending therefrom, said frame portion being pivotably attached to said substrate by said at least one compliant member and coupled to said at least one tether by at least one compliant member.

37. The system of Claim 36 wherein said compliant members comprise segmented torsional springs.

38. The system of Claim 36 wherein said frame portion is coupled to said at least one tether by at least one compliant member at a first point and attached to said substrate by a pair of compliant members at second and third points thereof, said second and third points being located between said first point and an end of said at least one tether opposite the end of said at least one tether attached to said frame.

39. The system of Claim 35 further comprising:

an actuator microstructure formed on said substrate, said actuator microstructure being coupled to said at least one tether and operable to effect lateral movement of said at least one tether in the direction parallel with the lengthwise axis of said at least one tether.

40. The system of Claim 39 wherein said actuator microstructure comprises an electrostatic actuator operable in response to a voltage applied across terminals thereof.

41. The system of Claim 39 further comprising:

at least one displacement multiplier coupling said at least one tether to a laterally moveable output of said actuator microstructure, said at least one displacement multiplier being configured for amplifying lateral movement of said laterally moveable output of said actuator microstructure into larger lateral movement of said at least one tether.

42. The system of Claim 41 wherein said actuator microstructure comprises a plurality of separate actuator units having a corresponding plurality of separate moveable outputs, and wherein said system further comprises:

a yoke coupling the moveable outputs of said plurality of actuator units to said at least one displacement multiplier.

43. A microelectromechanical system comprising:

substrate means for fabricating microelectromechanical components thereon;

platform means, fabricated on said substrate means, for supporting a desired optical element thereon, said platform means being elevatable in their entirety from said substrate means; and

at least one rotatable lever means, fabricated on said substrate means, for applying force to said platform means to achieve inclination of said platform means in at least a first direction that is the same as a direction in which said lever means are rotatable.

44. The microelectromechanical system of Claim 43 wherein said desired optical element comprises one of an optically reflective surface, a diffraction grating, a lens, and an optical polarizer.

45. The microelectromechanical system of Claim 43 further comprising:

actuation means, fabricated on said substrate means, for rotating said lever means.

46. The microelectromechanical system of Claim 45 wherein said actuation means comprise an electrostatic actuator.

47. The microelectromechanical system of Claim 43 wherein said substrate means comprises a silicon wafer.

48. The microelectromechanical system of Claim 43 wherein said platform means comprises a layer of one of monocrystalline and polycrystalline silicon deposited on said substrate means.

49. The microelectromechanical system of Claim 43 wherein said lever means comprise an A-frame structure.

50. The microelectromechanical system of Claim 43 further comprising:

first compliant means for attaching said lever means to said platform at a first attachment location; and

second compliant means for attaching said platform means to said substrate means at a second attachment location.

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51. The system of Claim 50 wherein said first and second compliant means comprise springs.

52. A microelectromechanical system comprising:

a substrate;

a platform;

a first lever arm attached to said platform by at least one compliant member and pivotably attached to said substrate at a first anchor point on said substrate; and

a second lever arm attached to said platform by at least one compliant member and pivotably attached to said substrate at a second anchor point on said substrate;

said first and second lever arms being pivotable about said first and second anchor points, respectively, in at least a first direction by equal angular amounts to tilt said platform with one degree of freedom in at least the first direction;

said first and second lever arms being pivotable about said first and second anchor points, respectively, in at least a first direction by unequal angular amounts to tilt said platform with respect to said substrate with at least two degrees of freedom.

53. The system of Claim 52 further comprising:

a first actuator microstructure formed on said substrate, said first actuator microstructure being coupled to said first lever arm and operable to effect pivoting of said first lever arm with respect to said substrate; and

a second actuator microstructure formed on said substrate, said second actuator microstructure being coupled to said second lever arm and operable to effect pivoting of said second lever arm with respect to said substrate.

54. The system of Claim 53 wherein said first and second actuator microstructures are separately operable without external feedback control to effect pivoting of said first and second lever arms, respectively, with respect to said substrate such that said platform is inclinable in a first direction with respect to said substrate at any angle within a first specified range of angles and inclinable in a second direction with respect to said substrate at any angle within a second specified range of angles.

55. The system of Claim 54 wherein the first specified range of angles is between 0 and 60 degrees and said second range of angles is between -45 and +45 degrees.

56. The system of Claim 53 wherein said first and second actuator microstructures comprise electrostatic actuators operable in response to control voltages applied across terminals thereof.

57. The system of Claim 56 wherein said platform is tiltable with respect to said substrate with one degree of freedom by applying the same level control voltage across terminals of said first and second actuator microstructures.

58. The system of Claim 52 further comprising:

a first tether coupling a laterally moveable output of said first actuator microstructure to said first lever arm; and

a second tether coupling a laterally moveable output of said second actuator microstructure to said second lever arm.

59. The system of Claim 54 wherein said first and second actuator microstructures are respectively comprised of first and second groups of separate actuators having separate laterally moveable outputs, and said system further comprises:

a first yoke joining said laterally moveable outputs of said first group of actuators together for connection with said first tether; and

a second yoke joining said laterally moveable outputs of said second group of actuators together for connection with said second tether.

60. The system of Claim 59 further comprising:

a first displacement multiplier coupling said first tether to said first yoke; and

a second displacement multiplier coupling said second tether to said second yoke.

61. The system of Claim 52 wherein said substrate comprises silicon.

62. The system of Claim 52 wherein said platform comprises one of monocrystalline and polycrystalline silicon.

63. The system of Claim 52 wherein said platform includes at least one of an optically reflective surface, a diffraction grating, a lens, and an optical polarizer.

64. The system of Claim 52 wherein said compliant members comprise springs.

65. The system of Claim 52 wherein said first and second lever arms have different lengths measured between where each said lever arm is attached to said substrate and to said platform.